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DHEC Health Advisory

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Prevention of Recurrent Methicillin Resistant *Staphylococcus aureus (MRSA)* Skin and Soft Tissue Infections

Also included in this Health Advisory is a flowchart for the "Initial Management of Suspected Community-Associated MRSA skin and soft tissue infections" (Figure 1) and an article from the DHEC Fall 2005 Epi-Notes entitled "The Overwhelming Challenge of Community Associated MRSA (CA-MRSA)"

Background Information

The epidemiology of community and healthcare-associated MRSA disease is changing. The bacterium *Staphylococcus aureus* continues to cause skin and soft tissue infections and serious invasive infections. The skin and soft tissue infections have become more extensive in many patients. Invasive infections are progressing more rapidly to become life threatening.

Key principles for patient management of all skin and soft tissue infections include early diagnosis and recommending standard hygiene at home and in the community (for more information: www.scdhec.gov/health/disease/acute/mrsa.htm). Physicians should seek information from their clinical laboratories about the prevalence of CA-MRSA outpatient infections in their communities. Physicians should: 1) always culture purulent skin or soft tissue lesions before further management; 2) always adequately drain abscesses at presentation and send material for culture and susceptibility testing ("D"-zone testing in the laboratory is necessary if erythromycin resistance and clindamycin susceptibility are found); 3) always determine severity of infection at presentation and consider need for hospitalization and empirical antimicrobial therapy; 4) always provide discharge instructions emphasizing the need for return if no clinical improvement within 48 hours.

CA-MRSA is a more virulent organism with a different genetics than the hospital acquired MRSA and a unique antimicrobial resistance patterns. Recurrent disease in a single patient, "ping ponging" infections within a single family, and outbreaks within community groups, childcare, schools, sports teams are more common with this new community strain.

Prevention of Recurrent MRSA Infection

Treatment of recurrent MRSA disease in the community is a significant challenge for clinicians. Early use of mupriricin for decolonization is not recommended. Careful use of the following criteria may be considered for prevention of recurrent MRSA infections for:

1. transmission among family and close contacts (2 to 3 recurrences in 6 months),
2. recurrent disease in an individual (2 to 3 recurrences in 6 months),
3. recurrent disease in group settings with close person to person contact with (2 to 3 recurrences in 6 months) in childcare, sports teams, residential facilities.

In addition to the basic hygiene program, clinicians may consider recommending all of the following to their patients for preventing recurrences:

- Personal hygiene: bathe daily, and after organized sports participation, with chlorhexidine or antimicrobial soap for 2 to 3 weeks and then continue with the antimicrobial soap for daily routine hygiene.
- Environmental: Wash bed linens, undergarments, sleepwear, towels and washcloths in hot water with detergent, **daily x 3 weeks.**
- Mupiricin (Intranasal) for decolonization **should be reserved** for these recurrent situations only. A reasonable dose would be 2% ointment with BID nasal application for 7 to 14 days.

**** These prevention measures** can be utilized more than once if the above recurrence criteria continue to be met. Referral to an Infectious Disease Specialist should be considered for recurrent infections and moderate to severe diseases.

Websites for Additional Information

CDC Information on CA-MRSA for Healthcare Professionals
(http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_clinicians.html)

South Carolina School and Childcare Exclusion Rules
(http://www.dhec.sc.gov/health/disease/exclusion.htm)

DHEC Fact Sheet on Community-Acquired MRSA
(http://www.scdhec.gov/health/region7/docs/factsheets/mrsa%20fact%20sheet.pdf)

DHEC Contact Information for Reportable Diseases and Reporting Requirements

Reporting of individual cases of MRSA is not part of the current DHEC List of Reportable Conditions. **However** outbreaks or clusters of cases are considered Reportable Immediately by Phone conditions. If you have any questions about reporting a possible MRSA cluster, please contact your local public health department at the numbers listed below.

Reporting of possible clusters of MRSA cases is consistent with South Carolina Law requiring the reporting of diseases and conditions to your state or local public health department. (State Law # 44-29-10 and Regulation # 61-20) as per the DHEC 2007 List of Reportable Conditions available at: http://www.scdhec.net/hs/diseasecont/disease.htm.

Federal HIPAA legislation allows disclosure of protected health information, without consent of the individual, to public health authorities to collect and receive such information for the purpose of preventing or controlling disease. (HIPAA 45 CFR §164.512).

Regional Public Health Offices – 2007

Mail or call reports to the Epidemiology Office in each Public Health Region.

Region I

Anderson, Oconee
220 McGee Road
Anderson, SC 29625
Phone: (864) 260-4358
Fax: (864) 260-5623
Nights / Weekends: 1-866-298-4442

Abbeville, Edgefield, Greenwood, Laurens, McCormick, Saluda
1736 S. Main Street
Greenwood, SC 29646
Phone: 1-888-218-5475
Fax: (864) 942-3690
Nights / Weekends: 1-800-420-1915

Region 2

Greenville, Pickens
PO Box 2507
200 University Ridge
Greenville, SC 29602-2507
Phone: (864) 282-4139
Fax: (864) 282-4373
Nights / Weekends: 1-800-993-1186

Cherokee, Spartanburg, Union
PO Box 4217
151 E. Wood Street
Spartanburg, SC 29305-4217
Phone: (864) 596-2227, x- 210
Fax: (864) 596-3443
Nights / Weekends: 1-800-993-1186

Region 3

Chester, Lancaster, York
PO Box 817
1833 Pageland Highway
Lancaster, SC 29721
Phone: (803) 286-9948
Fax: (803) 286-5418
Nights / Weekends: 1-866-867-3886

Region 3 (continued)

Fairfield, Lexington, Newberry, Richland
2000 Hampton Street
Columbia, SC 29204
Phone: (803) 576-2749
Fax: (803) 576-2993
Nights / Weekends: 1-888-554-9915

Region 4

Clarendon, Kershaw, Lee, Sumter
PO Box 1628
105 North Magnolia Street
Sumter, SC 29150
Phone: (803) 773-5511
Fax: (803) 775-9941
Nights/Weekends: 1-877-831-4647

Chesterfield, Darlington, Dillon, Florence, Marlboro, Marion
145 E. Cheves Street
Florence, SC 29506
Phone: (843) 661-4830
Fax: (843) 661-4859
Nights / Weekends: (843) 660-8145

Region 5

Bamberg, Calhoun, Orangeburg
PO Box 1126
1550 Carolina Avenue
Orangeburg, SC 29116
Phone: (803) 533-7199
Fax: (803) 533-7134
Nights / Weekends: (803) 954-8513

Aiken, Allendale, Barnwell
1680 Richland Avenue, W. Suite 40
Aiken, SC 29801
Phone: (803) 642-1618
Fax: (803) 643-8386
Nights / Weekends: (803) 827-8668 or
1-800-614-1519

Region 6

Georgetown, Horry, Williamsburg
2830 Oak Street
Conway, SC 29526-4560
Phone: (843) 365-3126, x-138 or x-174
Fax: (843) 365-3153
Nights / Weekends: (843) 381-6710

Region 7

Berkeley, Charleston, Dorchester
4050 Bridge View Drive, Suite 600
N. Charleston, SC 29405
Phone: (843) 746-3806
Fax: (843) 746-3851
Nights / Weekends: (843) 219-8470

Region 8

Beaufort, Colleton, Hampton, Jasper
219 S. Lemacks Street
Walterboro, SC 29488
Phone: (843) 549-1516, x-214
Fax: (843) 549-6845
Nights / Weekends: 1-800-614-4698

DHEC Bureau of Disease Control

Division of Acute Disease Epidemiology
1751 Calhoun Street
Box 101106
Columbia, SC 29211
Phone: (803) 898-0861
Fax: (803) 898-0897
Nights / Weekends: 1-888-847-0902

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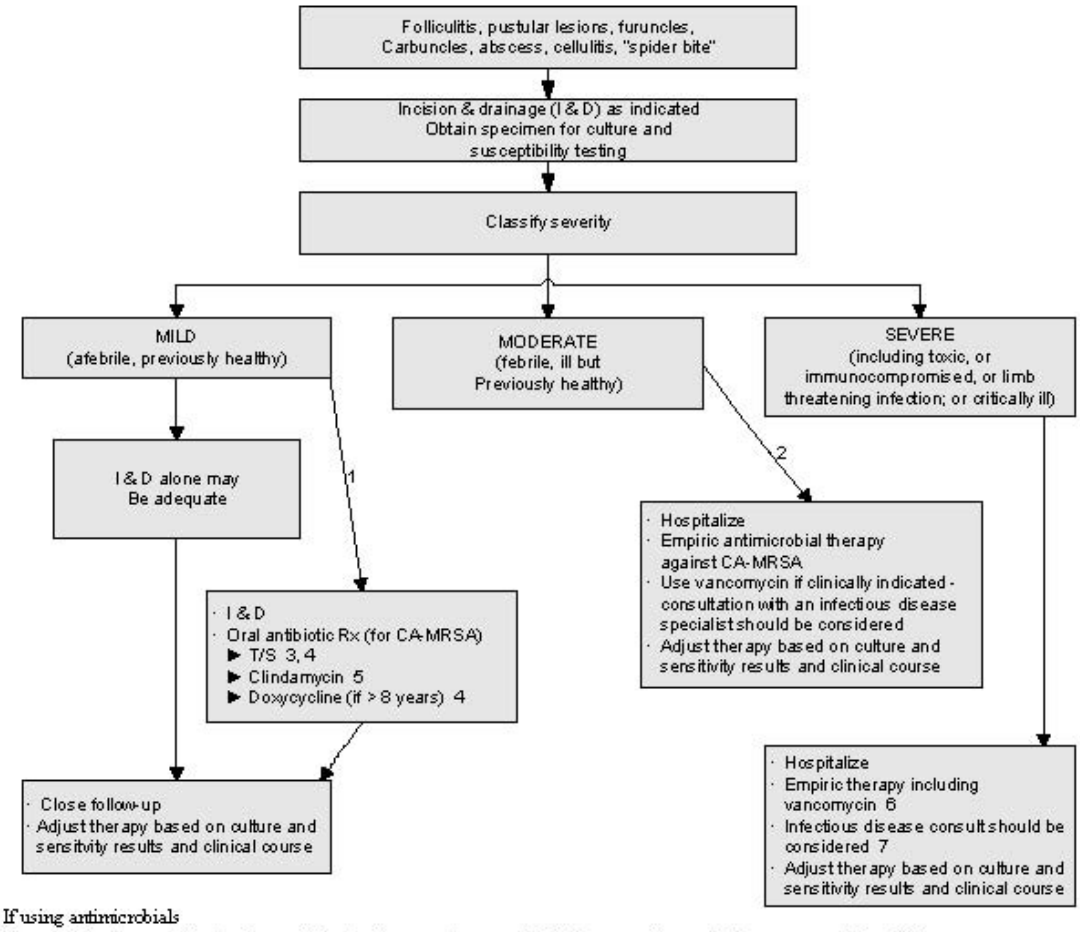
Categories of Health Alert messages:
Health Alert conveys the highest level of importance; warrants immediate action or attention.
Health Advisory provides important information for a specific incident or situation; may not require immediate action.
Health Update provides updated information regarding an incident or situation; unlikely to require immediate action.

Figure 1: A Suggested Initial Management Approach for Suspected Community-Associated Methicillin-Resistant Staphylococcus aureaus (CA-MRSA) Skin and Soft Tissue Infections (Communities in Which CA-MRSA Strains are Prevalent)



1. If using antimicrobials
2. If area of involvement is extensive, or if systemic symptoms are clinically concerning, or it there are compliance/follow-up concerns.
3. T/S=trimethoprim/sulfamethoxazole
4. T/S and doxycycline are not recommended treatments for Group A *Streptococcus* infection.
5. Do D-test if CA-MRSA isolate is erythromycin-resistant, clindamycin susceptible. There are a significant number of D-test positive CA-MRSA isolates in South Carolina.
6. Broad empiric therapy may be appropriate; consult with an infectious disease specialist should be considered. *AAP Red Book* recommends use of nafcillin + gentamicin in addition to vancomycin for empiric therapy of life-threatening infections.
7. Experience with new agents is limited, new applications of old agents are limited, and experience with these agents in children is limited.

Additional notes:

- Use quinolones, linezolid, daptomycin, tiglecycline, or quinupristin-dalfopristin (Q/D) in consultation with an infectious disease specialist where experience is limited.
- If initial parenteral therapy, consider switching to oral therapy based on susceptibility results if the patient is afebrile for 24 hours, clinically improved, able to take oral therapy, and close follow-up is possible. For severe infections, consult with an infectious disease specialist should be considered.
- Duration of treatment for most skin and soft tissue infections is 7-10 days, but may vary depending on severity of infection and clinical response.
- Consider hospitalization for infants less than 1 month of age.
- Obtain blood cultures on febrile infants with skin infection, and others as clinically indicated.

Adapted from the Minnesota Department of Health *Disease Control* Newsletter, Vol 32, Number 6.
(http://www.health.state.mn.us/divs/idepc/newsletters/dcn/index.html)

The Overwhelming Challenge of Community Associated MRSA (CA-MRSA)

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Health care professionals recognize *Staphylococcus aureus* as an important cause of disease and understand that antibiotic-resistant strains pose a threat to the community. No longer can methicillin resistant *S. aureus* (MRSA) be regarded as an exclusive nosocomial pathogen. With community associated MRSA (CA-MRSA), resistance and virulence have converged with a clone not seen before 2000 with molecular analysis pointing to a community origin. Recent 2001-2004 data from the Texas Children's Hospital revealed of the 3,586 community-associated staphylococcal infections presenting to the Emergency Department, 2,661 were methicillin resistant (74%) with 95.9% skin and soft tissue infections and 4.1% (110) systemic infections (osteomyelitis was the most common invasive CA-MRSA infection).

The epidemiologic definition of CA-MRSA disease is the development of infection with MRSA in the outpatient setting in a person with a medical history who in the past year has had 1) NO admission to a hospital, nursing home, skilled nursing facility, hospice; 2) NO dialysis or surgery; 3) NO history of MRSA infection or colonization and 3) NO permanent indwelling catheters or medical devices that pass through the skin into the body.

Outbreaks of CA-MRSA infections have occurred primarily in persons who often have close contact and have included prison inmates, military recruits, soldiers and crewmembers of a naval ship, players of contact sports (wrestling and football team members), children in daycare, and men who have sex with men.

CA-MRSA and health care associated MRSA (HCA-MRSA) infections have distinct clinical differences. While HCA-MRSA usually causes heterogeneous invasive infections, CA-MRSA infection is usually limited to skin and soft tissue but occasionally may be invasive. CA-MRSA infections usually present as folliculitis, pustular lesions and furuncles/ carbuncles/ abscesses. Many lesions are often mistaken for spider bites. Although the CA-MRSA epidemic spans the gamut of known skin and soft tissue infections from cellulitis to furuncles to frank abscess, a distinctive syndrome includes rapidly progressive cellulitis. Several invasive CA-MRSA syndromes deserve special mention, as they appear to be novel or at least not found in the recent literature. Necrotizing pneumonia with or without pleural empyema with CA-MRSA strains has been implicated in a destructive pneumonitis with loss of pulmonary architecture, microabcesses, and pulmonary vasculitis. Although streptococcal infections are a well-known cause of necrotizing fasciitis, this syndrome has been recently recognized as one that can be caused by CA-MRSA. At Texas Children's Hospital, septic thrombophlebitis caused by CA-MRSA has been described with clinical features reminiscent of endocarditis with sustained bacteremia and multiple embolic phenomena. Other fulminant invasive CA-MRSA infections include pyomyositis, osteomyelitis, arthritis, bursitis, and a new and devastating purpura fulminans syndrome.

The increased ability of CA-MRSA to spread among contacts and cause severe invasive disease is thought to be due to a distinct cytotoxin, called Panton-Valentine leucocidin (PVL) that is not found in HCA-MRSA. CA-MRSA isolates have a significantly different antibiotic resistance pattern from HCA-MRSA. The most important difference is that CA-MRSA isolates are not susceptible to B-lactam antibiotics because it harbors one of two novel methicillin-resistance cassette gene elements called SCCmec IV or V. However, CA-MRSA isolates are often susceptible to several non-B-lactam antibiotics that include vancomycin, clindamycin, doxycycline, gentamycin, and trimethoprim-sulfamethoxazole (TMP/SMX), but are frequently resistant to erythromycin and ciprofloxacin.

Currently, microbiology laboratories should routinely test *S. aureus* isolates for susceptibility to macrolides, clindamycin, and trimethroprim-sulfamethazole in addition to B-lactam antibiotics.

Most CA-MRSA isolates are resistant to macrolides but remain susceptible to clindamycin. In vitro resistance to both erythromycin and clindamycin predicts clinical failure with either agent. In vitro resistance to erythromycin but susceptibility to clindamycin by routine testing may not predict clinical effectiveness of clindamycin because of a property associated with erythromycin resistant CA-MRSA called inducible resistance to clindamycin. Treatment failures with clindamycin have occurred with MRSA isolates that possess clindamycin-inducible resistance. Clindamycin inducible resistance can be detected by a special, but simple test called the D-test. If this test is not available in the laboratory, the clinician should ask the laboratory unable to perform the D-test to report MRSA strains that it determines to be resistant to erythromycin as clindamycin resistant also.

The CDC recommendations for treating CA-MRSA infections are forthcoming. Interim recommendations are discussed below in an algorithm (Figure 1). In the September 2004 issue of the American Academy of Pediatrics (AAP) News (www. aapnews.org) an expert opinion guideline is available, including an updated "Management of skin and soft tissue infections: Principles".

Outbreaks of MRSA in group settings (e.g. childcare facilities, sports teams, residential institutions, etc.) should be reported to your local DHEC Epidemiology Office. During an outbreak, the molecular differences between CA-MRSA and HCA-MRSA permit distinction of isolates though specialized molecular techniques called PFGE (pulsed field gel electrophoresis). For certain MRSA outbreak situations, DHEC's Division of Acute Disease Epidemiology will request PFGE on a sample of outbreak isolates from the DHEC Bureau of Laboratories.

For more information on prevention and control, see the CDC web site www.cdc.gov/ncidod/hip/ARESIST/ca_mrsa.htm. Specific measures to control an outbreak of CA-MRSA and for management of household contacts can be found on the CDC website (www.cdc.gov/ ncidod/ hip/ARESIST /ca_mrsa.htm).

Physicians should seek information from their clinical laboratories about the prevalence of CA-MRSA outpatient infections in their communities. Physicians should: 1) always culture purulent skin or soft tissue lesions before further management; 2) always adequately drain abscesses at presentation and send material for culture and susceptibility testing ("D"-zone testing is necessary if erythromycin resistance and clindamycin susceptibility are reported); 3) always determine severity of infection at presentation and need for hospitalization and empirical antimicrobial therapy; 4) always provide discharge instructions emphasizing the need for return if no clinical improvement within 48 hours.

In areas where MRSA accounts for more than 10% of community associated *S. aureus* isolates, most authorities recommend considering modification for initial empiric therapy of severe infections most likely attributed to *S. aureus*. An increasing burden of MRSA disease, especially involving clones that cause more severe invasive infections, will have an enormous influence on the clinical approach to suspected staphylococcal infection. At a minimum, vigilance and a decrease in the threshold for obtaining cultures to document MRSA are warranted. Although an optimal management approach for CA-MRSA infections has not been established, the guidelines presented here represent the current view of many authorities. Seriously ill, hospitalized patients with suspected staphylococcal infection and significant CA-MRSA risk should be treated empirically with an antimicrobial regimen including vancomycin, with future clinical trials determining if another agent will displace vancomycin as the drug of choice. Also, with an increase in CA-MRSA infections, clinical trials are needed to assess the precise role of antimicrobial agents in the treatment of uncomplicated skin and soft tissue infections, to define agents most clinically effective and cost-effective. Pending future clinical trials, we hope these guidelines will be helpful in initiating empirical therapy for CA-MRSA infections, an identified public health challenge growing in our community.

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